The present invention relates to an interconnection strip, in particular for telephone or computer lines.

By way of state of the art, mention may be made of document EP-A-0.338.187 which describes, inter alia, a strip of this type. This strip, made of insulating material, is equipped with means for fixation on a profiled metallic receiver chassis which is earthed. It comprises, on its small front face, i.e. on its small face located opposite this receiver chassis when the strip is in place thereon, two parallel rows of self-stripping metallic contacts which may each receive the conducting core of an electric wire. According to this document EP-A-0.338.187, the strip may, when it is desired to plug thereon one or more protection modules which constitute the subject matter of this European Patent Application, cooperate with a metallic earthing comb which plugs, independently of the strip, on said profiled chassis in the same way as this strip.

The present development of telephone and computer techniques renders more and more complex the connector technology which necessarily accompanies the implementation of these more and more advanced techniques.

The consequence of these requirements is a multiplication, on the same connection installation, of strips each performing a specific function, which is particularly penalizing in cost price and dimensions of the line interconnection assemblies.

The invention aims at overcoming this drawback. To that end, it relates to an interconnection strip, more particularly for telephone or computer lines, this strip, whose body is made of insulating material, being equipped with means for fixation on a profiled metallic receiver chassis which is earthed, and comprising, on its small front face, i.e. on its small face located

opposite this receiver chassis when the strip is in place thereon, two rows of self-stripping metallic contacts which may each receive the conductor core of an electric wire, and said strip being characterized in that it comprises, as required, in removable manner or not, in addition to functional elements (conduit channels, technical modules...) provided to be fixed on its large side faces, one or more particular additional functional elements, including:

- one or more metallic earth contacts, lateral and removable, each adapted to receive at least one earthing wire, such as a data-processing cable "drain" wire, this or these removable metallic contacts being shaped to come into conducting abutment against the metallic receiver chassis when the strip is in place on the latter; and/or at least one longitudinal metallic half-grid with teeth, or "comb", coming into position on the side of the strip and on which may be plugged handles of mixing cords, this toothed half-grid being shaped in order, on the one hand, to be electrically connected to the above-mentioned metallic chassis when the strip is in place thereon and, on the other hand, via an electric contact which is respectively complementary of a tooth of this half-grid and which is consequently provided in the handle of the mixing cord, to ensure an earth contact with a drain wire or screen provided in that case in the cable of this mixing cord;

- and/or a rigid metallic board cut out in the form of a flat comb, or a printed circuit board for interconnection of rear contacts of the strip, one and the other being adapted to plug solidly by the rear of the strip in a longitudinal slot provided therein to that end, so as to be inserted between the so-called "cut-out" studs normally provided in the bottom of this strip.

In any case, the invention will be readily understood and its advantages and other characteristics will appear from the following description of a non-limiting embodiment of this multi-function strip, with reference to the accompanying schematic drawing, in which:

Figure 1 is a perspective view of this strip, with two lateral, metallic, drain connection contacts ready to be placed respectively on the two sides of this strip.

Figure 2 shows this same strip with these two contacts placed in position, and one of them receiving a drain wire.

Figure 3 shows the strip of Figure 2 ready to receive a toothed half-grid previously equipped with two conduit channels modified in order each to fit a half-grid of this type.

Figure 4 succeeds the preceding Figures and shows in the same way this strip with two toothed half-grids installed and ready to receive mixing cord handles adapted accordingly.

Figures 5 and 5A show, with parts torn away, how location of such a mixing cord handle is effected.

Figure 6 shows how a technical module adapted to be clipped on this strip may itself be modified to fit this toothed half-grid.

Figure 7 shows a rigid metallic comb for short-circuiting all the contacts of the strip, this comb being ready to be plugged at the rear of this strip.

Figure 8 is a view, with parts torn away, showing this comb positioned in the strip.

Figure 9 is a view similar to Figure 8, with a plastic plug for insulation of one of the terminals of the strip plugged in this strip.

Figure 10 is a view of an example of printed circuit which may be plugged in place of this rigid metallic

comb.

Figure 11 shows a variant embodiment of the comb shown in Figure 7.

Figures 12 and 13 are, respectively, a partial lateral view in (sic)a view in section along XIII-XIII of Figure 12, of this strip mounted on two receiver chassis of very different types.

Figures 14 to 16 are rough representations of three modes of implantation and of wiring of strips according to the invention.

Figures 17 and 18 are, respectively, an exploded view in perspective and a view in perspective almost all assembled, of a variant embodiment of this strip.

Referring to Figure 1, this novel multi-function strip 1 is shown here totally bare, and ready to receive firstly two lateral metallic contacts 2 for connection to the metallic receiver chassis (not shown), of earth wires such as the "drain" wires which conventionally equip data-processing line cables. Figure 2 shows these two contacts 2 plugged along each lateral edge 3, 4 of the strip 1, a drain wire 5 being in that case positioned against the metallic contact 2.

As shown in these two Figures 1 and 2, it is question of two elastic metallic contacts, somewhat in the form of a hair pin comprising two branches joining on a common folding edge 6 and, at rest, forming therebetween a small but non-zero angle (a) (of the order of 10 to 20 degrees to give an idea):

. a long, elastic principal branch 7 whose free end 8 is shaped to come, when this branch 7 is plugged completely (Figure 2) and with clearance through a receiver recess 9 provided to that end on the corresponding lateral edge 3 of the strip 1, into conducting abutment against the metallic receiver chassis of the strip 1. Such a receiver chassis is not shown on the strip, but it may be question

for example of one or the other of the receiver chassis 53 and 54 which are shown in Figures 12 and 13 which will be described hereinafter.

. And a shorter elastic branch 10 which, moreover in this embodiment, is composed of two parallel, identical branches 10A and 10B. These two branches are provided to be plugged (Figure 2) with clearance through two other receiver recesses 11 and 12, parallel to recess 9 and formed by moulding in the body of the strip 1. As shown clearly in Figure 2, the drain 5 of the data-processing cable is introduced for example in recess 12 (after positioning of contact 2) in the direction F1, while the elastic tab 10B is pressed in direction F2. This tab 10B is then released and electrical contact is then established between the drain 5 and the tab 10B, i.e. via the bearing tab 8, between this drain 5 and the metallic receiver chassis on which the strip 1 is assumed to be positioned.

In this way, an earthing of the drains 5 is obtained, which does not require providing, as is usually the case, a drain collector strip. Moreover, as each drain 5 is easily disconnectable from its receiver recess, such as recess 12, management of these drains for testing and/or repair operations is greatly facilitated.

Referring now to Figures 3 to 6, this same strip 1 may also receive one or two metallic toothed half-grids 13A, 13B (Figures 3 and 4) or "combs" whose role is to ensure a screen continuity along the mixing cords which are currently used to make interconnections between two strips placed on two distinct chassis.

These mixing cords, whether it be question of "one pair", "two pair" or even "four pair" cords, do not usually comprise a metallic hoop forming screen, with earthing drain pressed between this hoop and the outer sheath all

along the cable that the cord comprises, as is currently the case for data-processing cables.

The invention therefore overcomes this drawback by two concomitant arrangements:

. On the one hand by the presence of these two metallic half-grids 13A and 13B which are each provided with two supple lateral contacts 14 each provided to plug in the recess 9 which already receives the principal branch 7 of the lateral contact 2 mentioned above, and therefore in electrical contact with this branch 7. This half-grid 13A or 13B is then consequently connected to the earth constituted by the receiver chassis and, when the half-grid is positioned on the strip (Figures 3 and 4), its teeth 15 come to rest on the top (or the underneath) of the vertical wall 16 (Figure 4) which separates two consecutive receiver recesses 17A, 17B of pair(s) of the strip.

. On the other hand by the fact that, so as to cooperate in complementary manner with one or two of these teeth 15, each handle 18 of mixing cord 59 comprises (Figures 4 to 5A) a supplementary metallic contact 19, in U form in this embodiment, which defines two tabs 20 provided to overlap these two superposed teeth 15 closely (one on each half-grid 13A and 13B), thus ensuring electrical earth contact when this handle 18 is plugged on the strip 1. A rapid connection slot 21 is provided on the transverse branch 22 of the contact 19 to receive a drain wire 23 which is provided, in association with a wound metallic hoop 64 forming screen, in the cable 24 of the mixing cord 59 (Figure 5).

It is then ascertained that, except at the level of the strip 1 itself, the screen continuity is thus ensured all along the circuit.

It should be noted that, in the absence of contacts 2, the earthing branches 14 of each half-grid 13A, 13B

may be provided to be longer in order to come, like the above-mentioned branches 8, into abutment at the end of stroke against the metallic receiver chassis.

It should be noted that, in addition, as shown in Figures 5 and 5A, there are provided, both on the upper face 25 of the strip 1 and in the handle 18 of the mixing cord 59, location means which are here constituted by the fact that, one upper recess of the strip 1 out of two, the median half-walls 26, 27 of this recess are of different heights h1, h2 and that, correspondingly, one of the four normally complementary protuberances 28 in the handle 18 is missing.

The half-grids 13A, 13B are not normally well fitted on the strip if the latter is bare. This is why, as shown in Figures 4 and 6, it is provided to fit them with the aid of functional elements added by clipping on the large lateral faces of the strip:

. According to Figure 4, there are provided two conduit channels 29 on each side of the strip 1, these conduit channels, basically very conventional, presenting, however, protuberances 30 adapted to cooperate with complementary notches 31 (Figure 3) provided to that end on each half-grid 13A or 13B: grid 13A for example, once placed in position, is then fitted in depth by the front lateral wall 32 of the conduit channel 29, and fitted laterally by cooperation of these protuberances 30 with these notches 31.

. According to Figure 6, a clippable technical module 33 has its upper transverse wall 34 provided with long notches 35 which are provided to receive tightly the transverse part 65 (Figure 3) of the half-comb 13A, with its notches 31 mentioned above, thus ensuring hold and fit of this half-comb 13A.

Referring now to Figures 7 to 11, the rear part

of this strip is slit over virtually the whole of its length (slot 39) to receive a flat and rigid element which is then inserted between its cutting studs 36, 37 (Figure 8).

According to Figures 7 to 9, it is thus desired to connect all the studs of the strip 1 to the earth of the chassis, in order for example thus to create a drain collector strip.

The pluggable flat element is in that case a rigid metallic board 38 which is cut out in the form of a comb, so that, once this comb 38 is plugged by the rear of the strip in the receiver slot 39, each tooth 40 of this comb is inserted between two cutting studs 36, 37 of the bottom of the strip, by spacing them apart.

A given stud, such as stud 37 for example (Figure 9) may thus be insulated, for testing needs for example, by plugging in the strip a conventional cutting plug 61 of plastics material.

It should be noted that, in order to avoid that the comb 38 is then ejected from the strip, means for connecting the comb 38 and the strip 1 are provided, either by the presence of complementary perforations 41 on the comb and 42 on the strip, adapted to receive connecting pins, or by the fact that the metallic surface of the comb 38 is provided with small non-return protuberances, or "fir trees".

As shown in Figure 8, earthing of the comb 38 may be effected with the aid of a cord 43, provided with an earthing terminal 44, which is then welded on one of the two lateral tabs 45 of the comb 38, provided to that end on the latter.

In a variant, as shown in Figure 11, these tabs 45 may be replaced by two tuning fork contacts 46, provided to come into elastic electrical contact on the receiver

chassis when the strip 1 is in place thereon.

In place of the metallic comb 38, it may be provided to plug in the slot 39 a rigid printed circuit board 47 (Figure 10) whose conducting etching 48 is for example provided to ensure a D.C. supply multiplexing: with the double etching "in comb form" shown, if a D.C. voltage is applied between the cutting studs 36 and 37 (Figure 8) of the strip 1, this voltage is multiplexed on all the other similar couples of cutting studs of this strip.

The multi-functional character of this strip does not stop there, and Figures 12 and 13 show that its rear base 49 is provided with two bearing members 50 and 51 which are provided from moulding on either side of the central part 52 of this strip 1 and largely spaced therefrom, so that the strip 1 may thus be fixed by clipping on metallic receiver chassis of very different shapes, and in particular:

. either on a metallic receiver chassis 53 of "U"-section;

. or on a metallic receiver chassis 54 profiled in the form of a flat board 56 provided in its central part with high longitudinal ribs 55 of various shapes.

Finally, the fact that this strip may or may not be equipped with conduit channels 29, as desired, renders it equally well usable for the different sorts of conventional wiring of telephonic distributors comprising such strips: front-to-rear wiring, flat wiring, symmetrical wiring.

Figure 14 shows, in a very schematic plan view, the use of strips (1) according to the invention for a very high capacity telephonic distributor, with so-called "front-to-rear" wiring.

As is well known, such a distributor is constituted by a more or less large number of "trusses" 56 which are each composed of a front "U" chassis 53A and a rear

"U" chassis 53B, these two chassis being joined by a stable frame 57.

Each front chassis 53A comprises a more or less large number of pluggable strips 1A according to the invention and each rear chassis 53B comprises in the same way a more or less large number of pluggable strips 1B, always of this same type.

The electrical connections between strips 1B of the "rear face" of the distributor and strips 1A of its "front face" are conventionally effected with the aid of pairs of twisted wires called "jumper wires" 58A, 58B, 58C,...

As shown in the drawing, these connections may be equally well effected by a jumper wire 58A which emerges and returns on the same side (here the right-hand side) of the two strips 1A, 1B to be connected, or by a jumper wire, 58B or 58C, which emerges on one of the sides of one strip 1A and returns on the opposite side of the associated strip 1B. For a use of this type, strips 1A and 1B used will therefore be strips according to the invention but either not comprising conduit channels 29, or comprising, at least for the jumper wires, conduit channels presenting symmetrical outputs.

Figure 15 shows, in front view, the use of strips according to the invention for small-capacity distributors, with so-called "flat" wiring.

This distributor is composed of two coplanar columns of strips, viz. an admission column 59 and an outgoing column 60.

Each of these columns is composed of a "U" chassis 53C and 53D which receives the admission strips 1C and the outgoing strips 1D, and which is fixed on two cross-pieces 61 and 62.

The connections between strips are in that case

effected by jumper wires 63, 64, ... which all pass in support rings 65 fixed on the upper crosspiece 61, and which connect contacts located on a first half, left or right, of a strip 1C, to the symmetrically corresponding ones located on the other half, therefore right and left respectively, of a strip 1D.

In such a wiring configuration, strips 1C and 1D according to the invention will again be either not equipped at all with conduit channels 29, or, concerning the jumper wires, will be equipped with conduit channels presenting symmetrical outputs.

Figure 16 shows, in the same way as in Figure 15, a distributor of the same type but with so-called "symmetrical" wiring.

In such a case, the support rings 65 are not placed on the above-mentioned crosspieces, but on the two sides opposite the columns 59 and 60, on either side of the vertical axis of symmetry 66. Each jumper wire 67 therefore circulates as shown in the rings of one column, then in the rings of the other column, and it therefore always emerges on the same side (the right-hand side) of a strip 1C of the column 59 in order to enter on the conjugate strip 1D of the column 60 on the other side (the left-hand side) of this latter strip. In this case, the admission cable of the left-hand column arrives on the left-hand side of the strips while the outgoing cable lies on the contrary at the right hand end of the distributor.

The strips 1C and 1D according to the invention will then be advantageously provided with clippable conduit channels 29, these latter being with output on the right for strips 1C and with output on the left for strips 1D.

Finally, Figures 17 and 18 show a strip of the same type as hereinabove, but using toothed half-grids 13A,

13B which differ from the preceding ones:

. by the fact that they are each applied against a respective lateral face of the strip 1, each with a lateral earthing contact 14, with the result that, for the major part, they are positioned beneath the conduit channels 29, which thus maintain them positively while opposing extraction thereof;

. and by the fact that a supplementary tooth 15A is each time provided between each couple of adjacent contact teeth 15 previously described, for the purpose of ensuring an earth contact for in particular a mixing cord comprising only one pair with screen, the U contact 20 mentioned above then being placed in the middle consequently to be plugged on the two corresponding supplementary teeth 15A of the two toothed grids 13A, 13B.

It goes without saying that the invention is not limited to the embodiment which has just been described, and the multi-functional characteristics of this strip are in no way limiting, whether they are present alone or in association with others.

CAS 9139

CLAIMS

1. Interconnection strip, in particular for telephone or computer lines, this strip (1), whose body is made of insulating material, being equipped with means for fixation on a profiled metallic receiver chassis (53, 54) which is earthed, and comprising, on its small front face (16, 17A, 17B), i.e. on its small face which lies opposite this receiver chassis (53, 54) when the strip (1) is in place thereon, two rows of self-stripping metallic contacts which may each receive the conducting core of an electric wire, characterized in that it comprises as required, in addition to the functional elements of the conduit channel (29) or technical module (33) type which are provided to be fixed on its large lateral faces, one or more particular additional functional elements, of which:

. one or more metallic earth contacts (2), lateral and removable, each adapted to receive at least one earthing wire (5), this or these metallic contacts (2) being shaped (8) to come into conducting abutment against the metallic receiver chassis (53, 54) when the strip (1) is in place on the latter;

. and/or at least one longitudinal metallic half-grid (13A, 13B) with teeth (15), or "comb", coming into position on the side of the strip (1) and on which may be plugged handles (18) of mixing cords (59), this half-grid (13A, 13B) being shaped (14, 15) in order, on the one hand, to be electrically connected to the above-mentioned metallic chassis (53, 54) when the strip (1) is in place thereon, and, on the other hand, via an electric contact (20) which is respectively complementary of a tooth (15) of this half-grid (13A, 13B) and which is consequently provided in the handle (18) of the mixing cord (59), to ensure

an earth contact with a drain wire (23) or screen provided in that case in the cable (24) of this mixing cord (59);

. and/or a rigid board, such as a metallic board pre-cutout in the form of a flat comb (38) or a printed circuit board (47), for interconnection of rear contacts (36, 37) of the strip, adapted to plug solidly by the rear of the strip, in a longitudinal slot (39) provided therein to that end, so as to be inserted between so-called "cut-out" studs (36, 37) normally provided in the bottom of this strip.

2. Strip according to Claim 1, characterized in that said lateral metallic contact (2) is an elastic contact which comprises two elastic branches (7, 10) joining on an edge of fold (6) so as to form therebetween, and at rest, a small but non-zero angle (a):

. a principal branch (7) of which the free end (8) is shaped to come, when this branch (7) is plugged completely through a receiver recess (9) provided to that end on the corresponding lateral edge (3, 4) of the strip (1), into conducting abutment against the metallic receiver chassis (53, 54) of the strip; and

. another elastic branch (10) provided to plug with clearance into at least one receiver recess (11, 12) of the strip, this latter being adapted also to receive at least one earthing wire (5).

3. Strip according to Claim 2, characterized in that this half-grid (13A, 13B) with teeth (15) is provided with one or two lateral contacts (14) which come, upon assembly, into close conducting contact with said metallic earth contact (2), in order thus to ensure their electrical link with said receiver chassis (53, 54).

4. Strip according to one of Claims 1 to 3, characterized in that, conduit channels (29) or technical modules (33) being provided to fit conventionally on its large lateral

faces, these conduit channels (29) or these technical modules (33) are shaped, in particular by the set of notches (31, 35) and of protuberances (30) complementary of one another and provided both on the latter (29, 34) and on the half-grid (13A, 13B), to fit this half-grid (13A, 13B) in position on the strip (1).

5. Strip according to one of Claims 1 to 4, characterized in that it comprises means (26, 27) for locating the position of plugging of the handle (18) of the mixing cord (59).

6. Strip according to one of Claims 1 to 5, characterized in that each toothed half-grid (13A, 13B) comprises, between each couple of adjacent contact teeth (15), a supplementary tooth (15A) adapted to ensure an earth contact in particular for a mixing cord comprising only one pair with screen.

7. Strip according to one of Claims 1 to 6, characterized in that the toothed half-grid (13A, 13B) is designed to be applied against the lateral face of the strip (1) and so as to come into position beneath the conduit channel (29), this latter thus opposing extraction of this half-grid.

8. Strip according to one of Claims 1 to 7, characterized in that it comprises a mixing cord of which the handle (18) comprises a U-shaped contact (19) whose lateral branches (20) are provided each to rub against a tooth (15) of the half-grid or grids (13A, 13B), and of which the transverse branch (22) comprises means (21) for connection of a drain wire (23) which is provided, in the cable (24) of this cord (59), to be in electrical contact with a metallic screen (64).

9. Strip according to one of Claims 1 to 7, characterized in that complementary means (41, 42) are provided both in the strip (1) and said rigid rear board (38, 47),

to retain this board in this strip.

10. Strip according to one of Claims 1 to 7, or 9, characterized in that said rear rigid metallic board in the form of comb (38) is equipped with lateral branches (45, 46) intended to allow its connection to said metallic receiver chassis (53, 54), either by welding of an earthing wire (43) or by direct elastic contact (46) with this chassis.

11. Strip according to one of Claims 1 to 7, or 9 , or 10, characterized in that its rear base (49) is provided with two bearing members (50, 51) which are placed on either side of the central part (52) of this strip (1), and largely spaced apart therefrom, so that the strip (1) may thus be fixed by clipping on metallic receiver chassis of very different shapes, and in particular:

. either on a metallic receiver chassis (53) of U-section;

. or on a profiled metallic receiver chassis (54), in the form of a flat board (56) provided in its central part with longitudinal ribs (55).

12. Distributor equipped with strips according to one of Claims 1 to 7, or 9 to 11, characterized in that these strips (1A, 1B, 1C, 1D) are used with conduit channels (29) in the case of a symmetrical wiring, while they are used, in the case of a flat wiring or in the case of a front-to-back wiring, either without conduit channels or with certain conduit channels, but the latter being of type having symmetrical outputs.

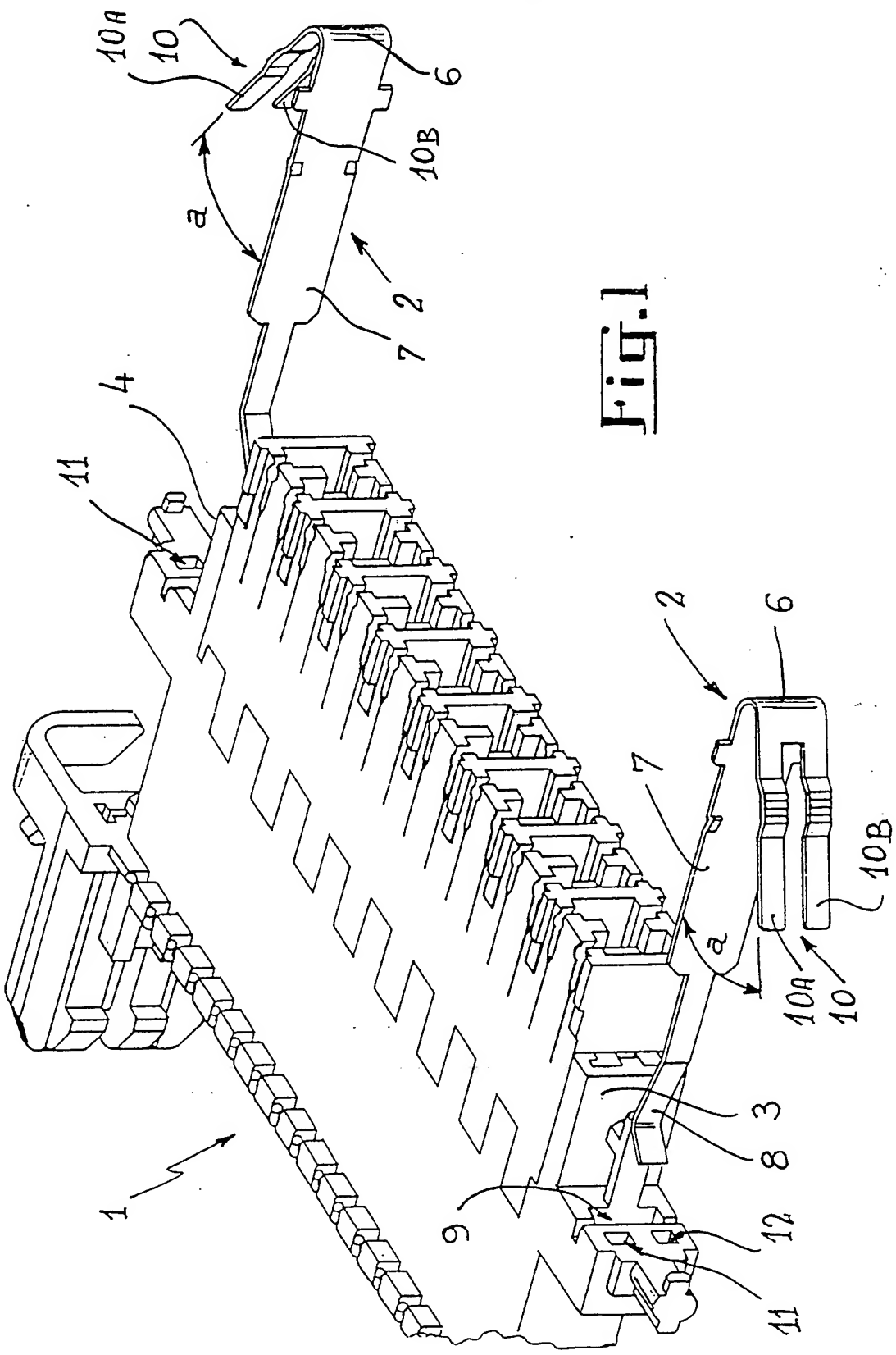


Fig.1

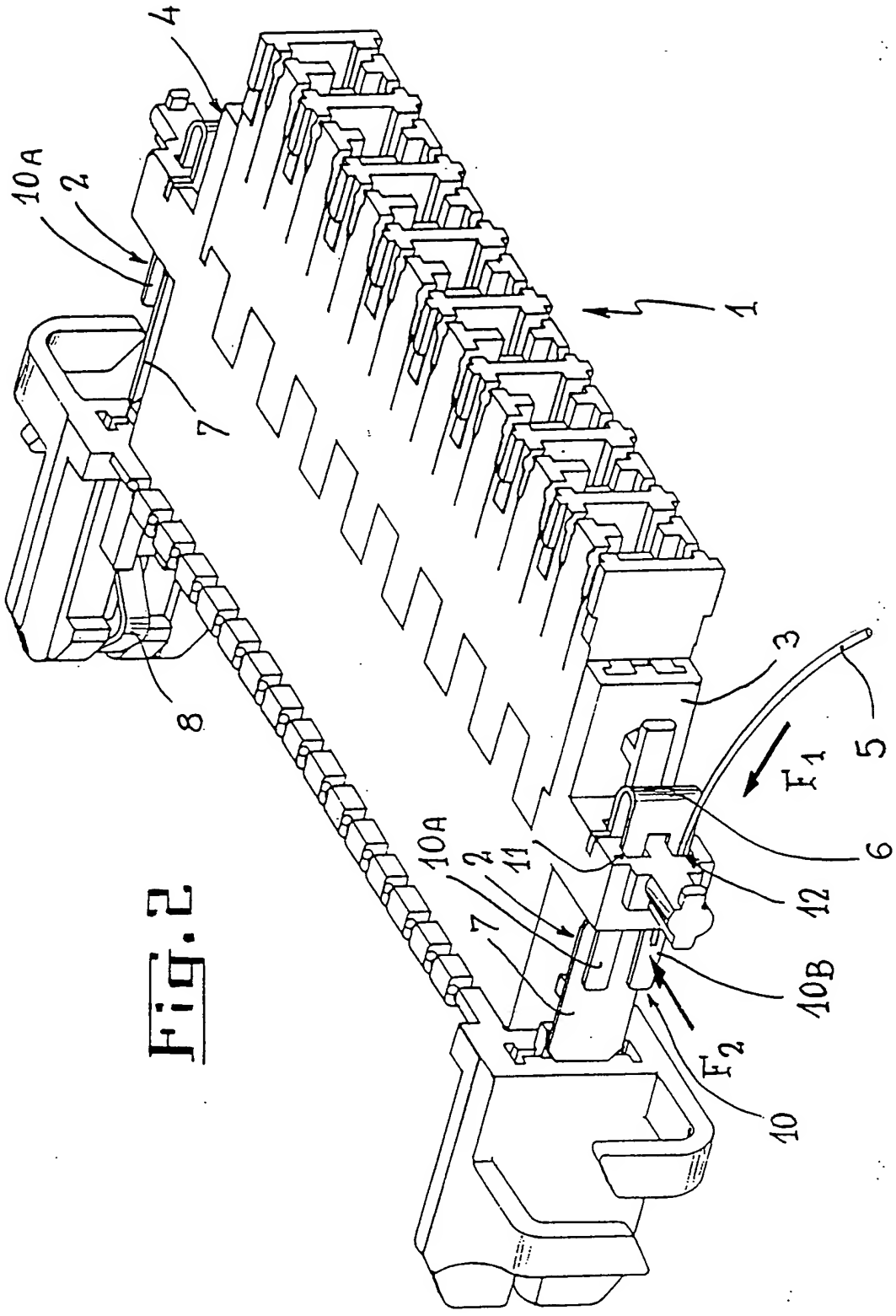
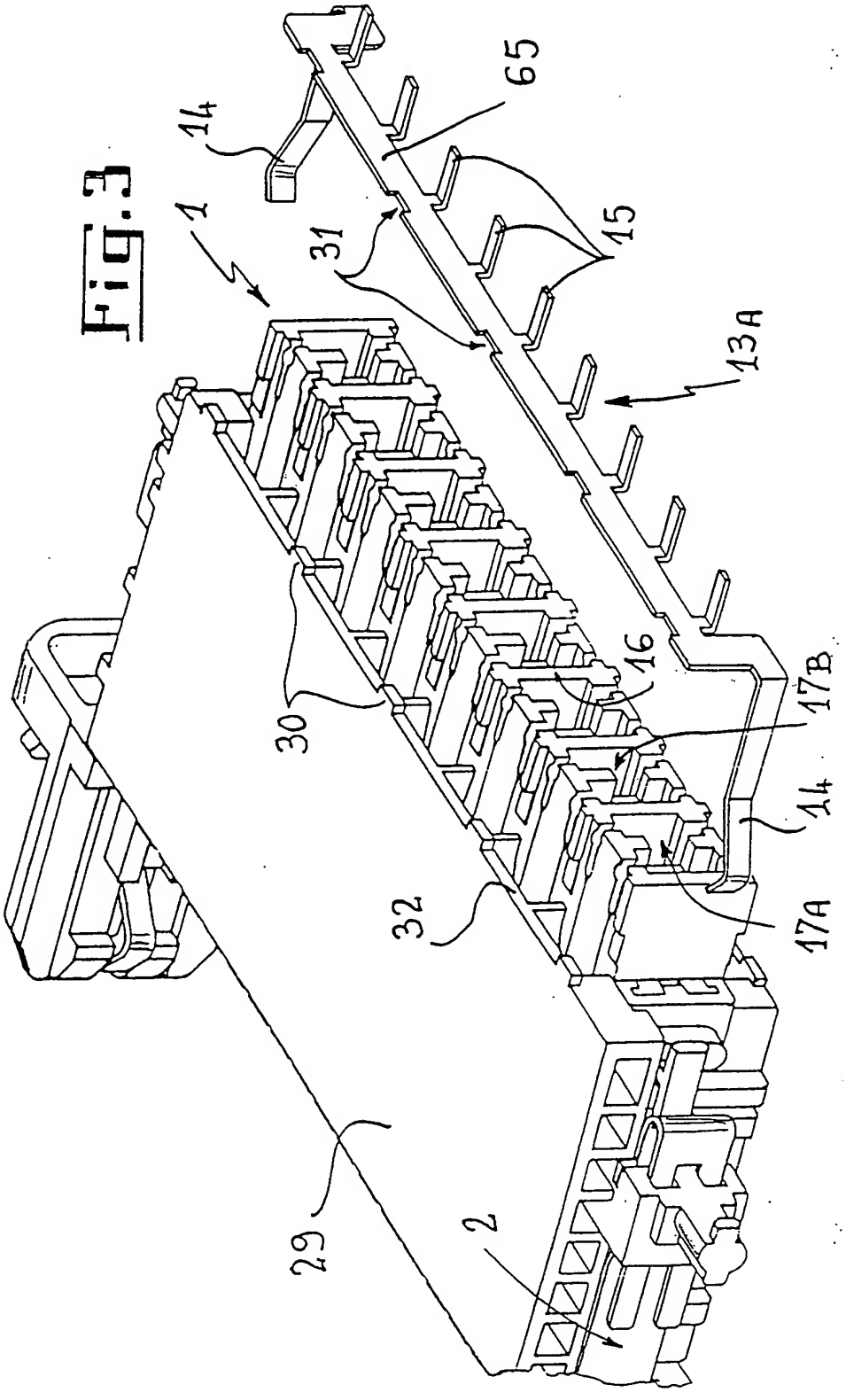


Fig.2

Fig.3



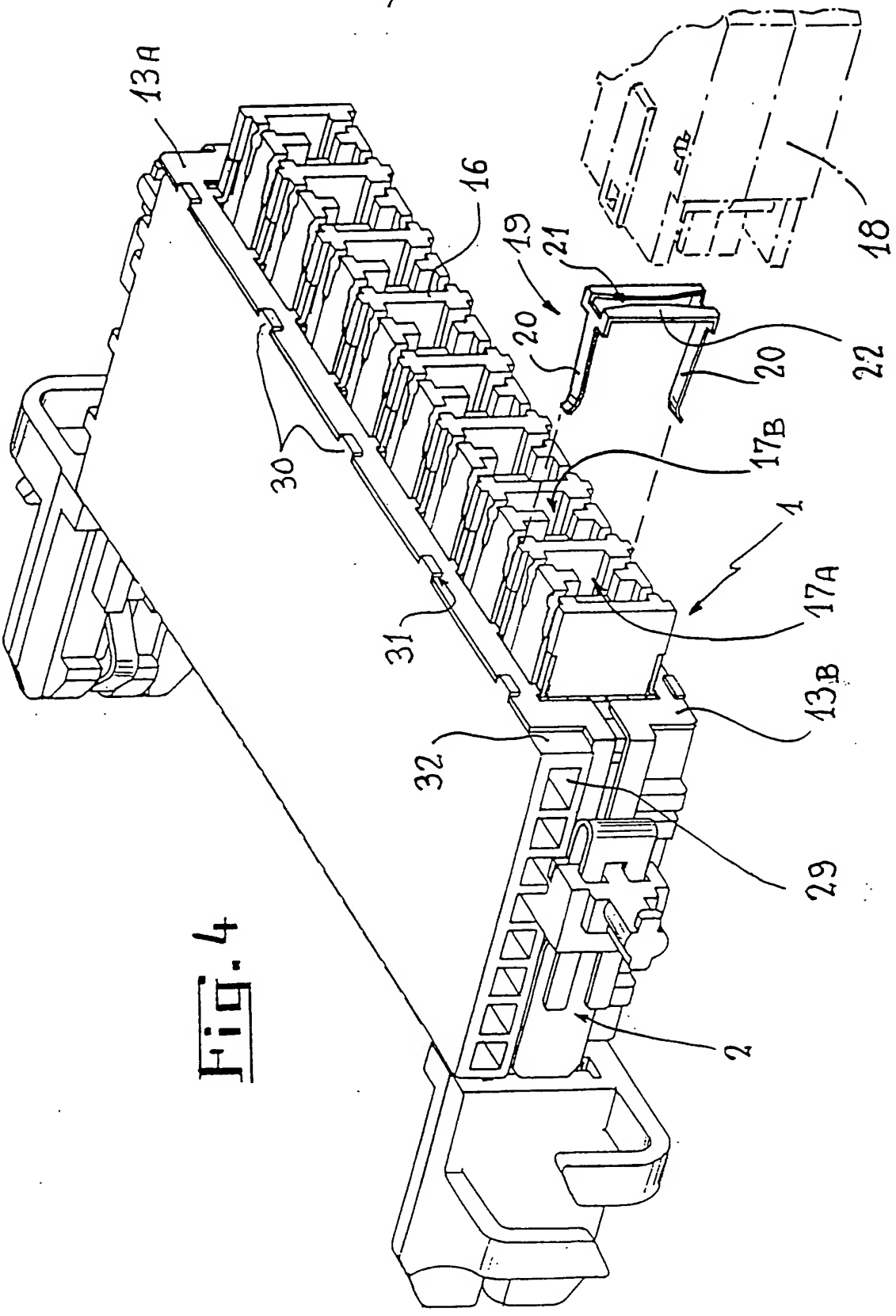


Fig. 4

Fig. 5

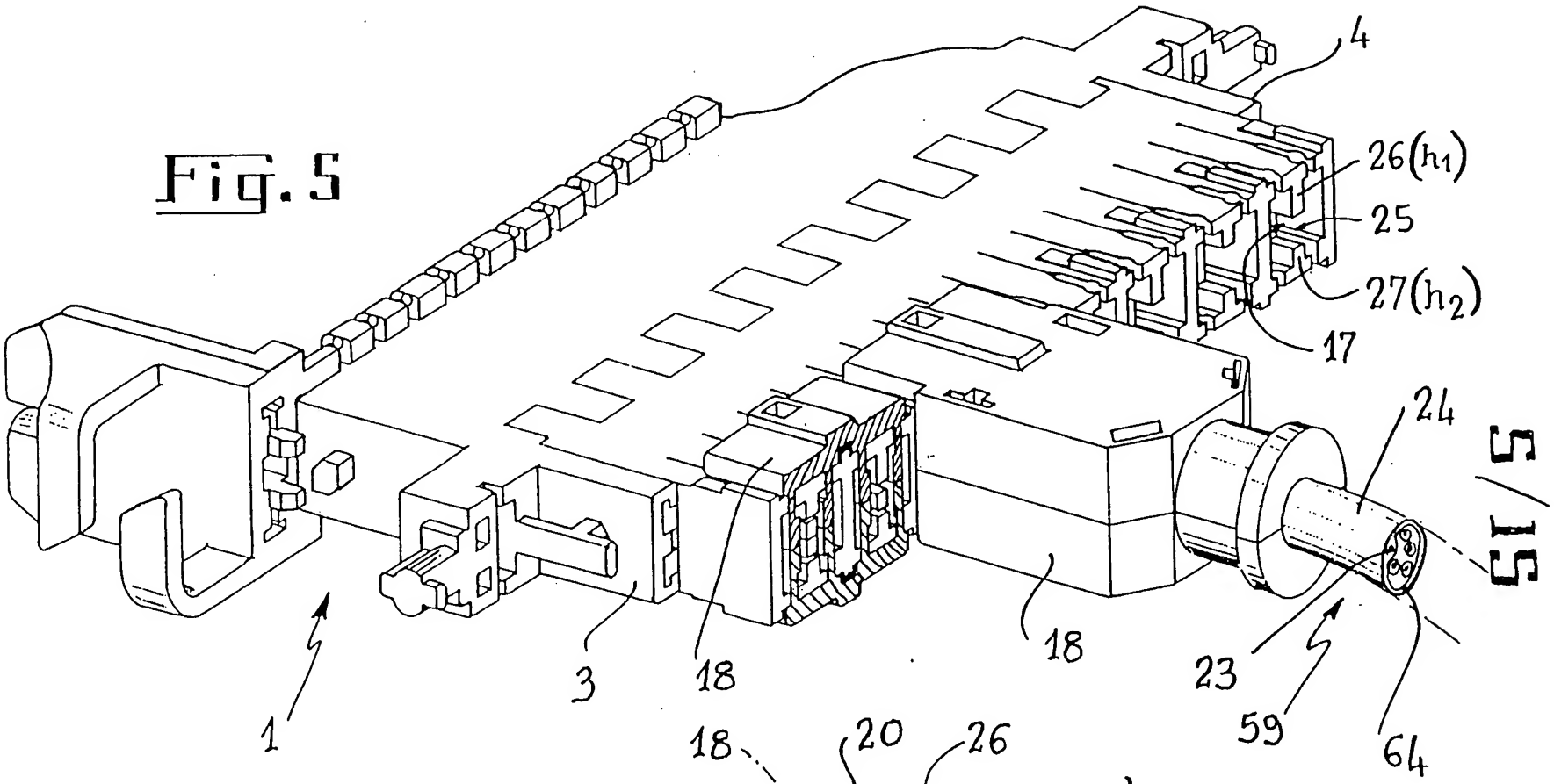
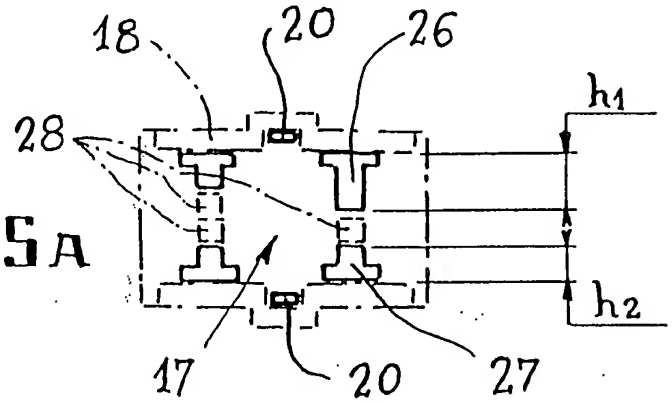


Fig. 5A



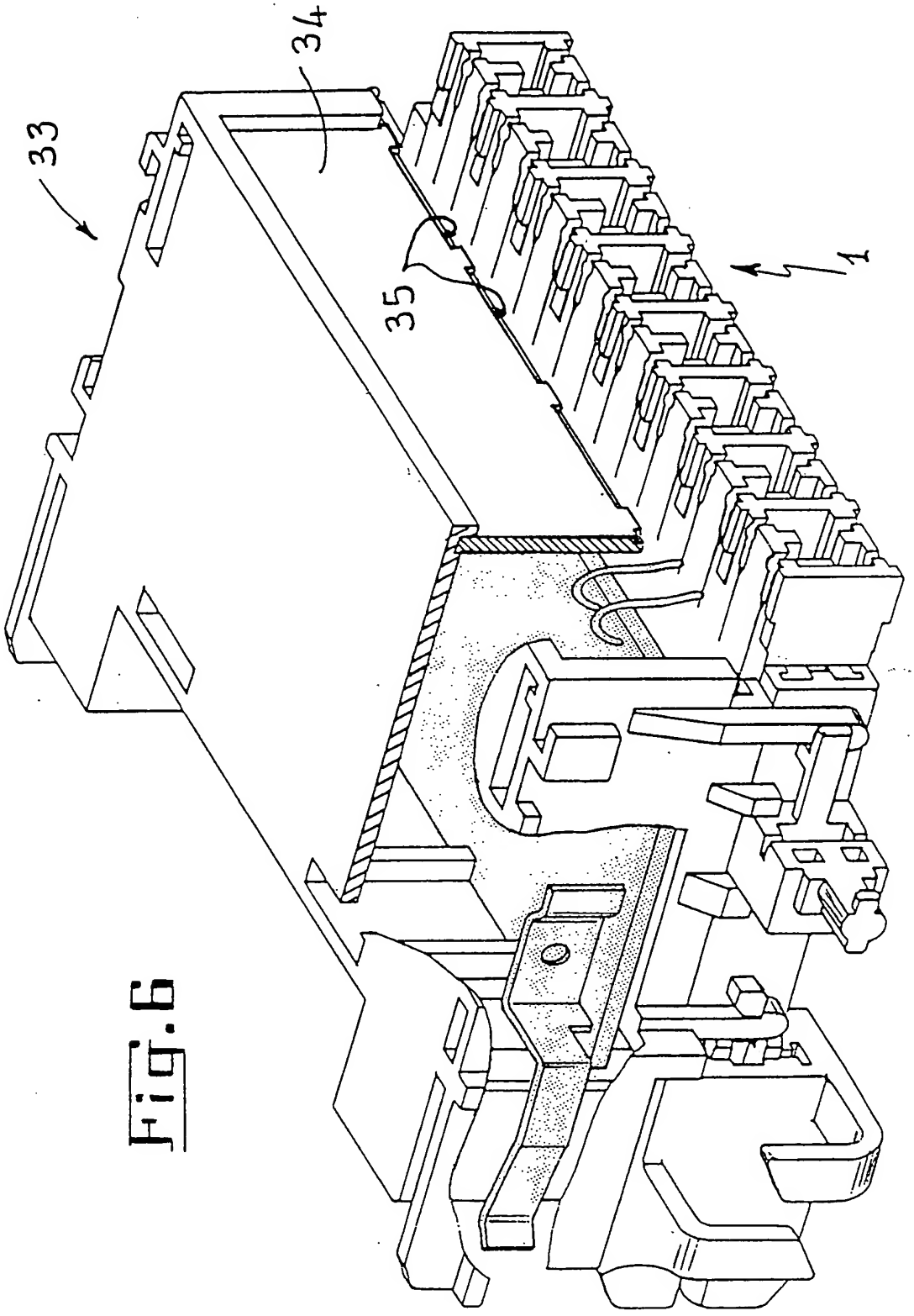


Fig.6

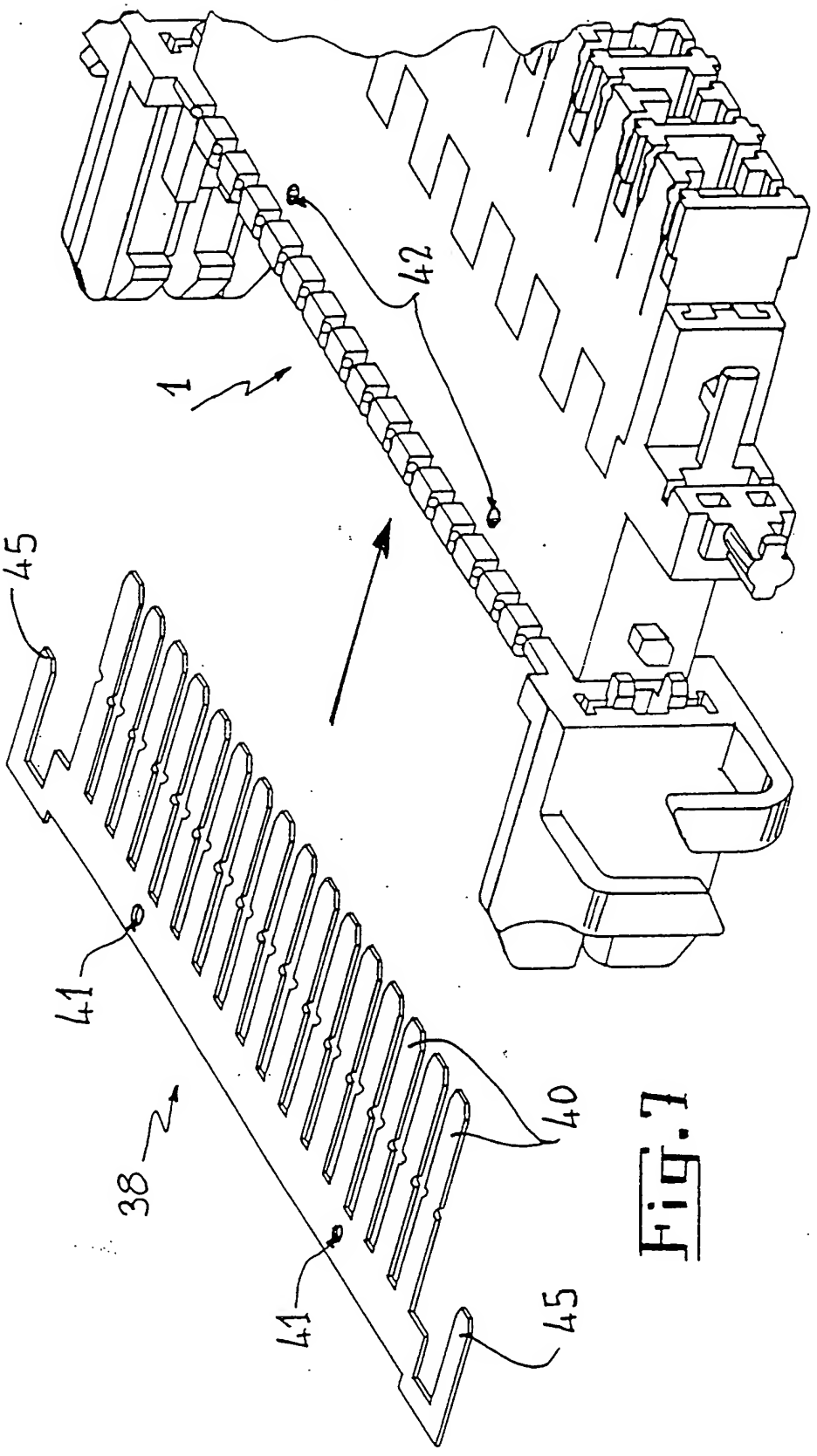


Fig. 1

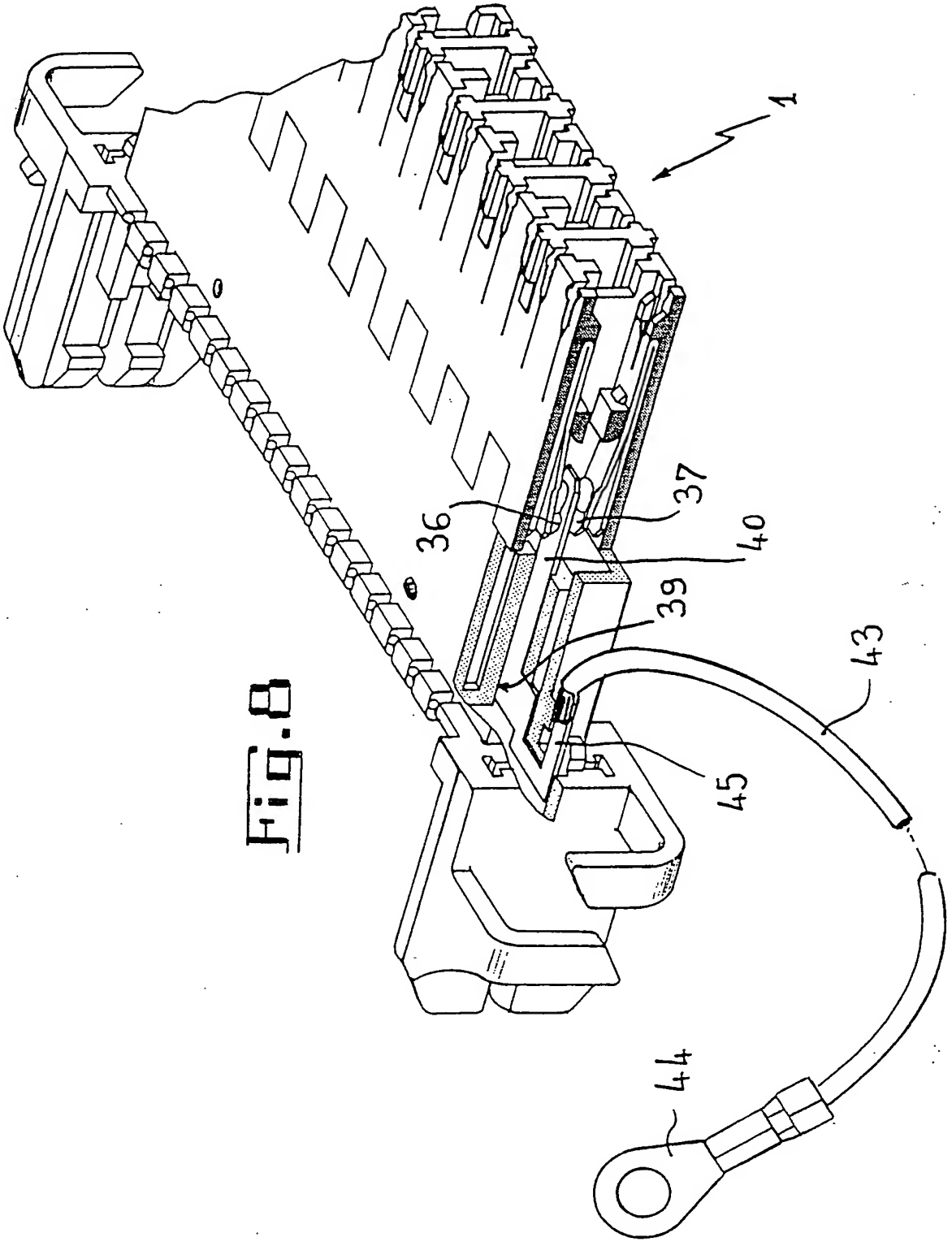


Fig.8

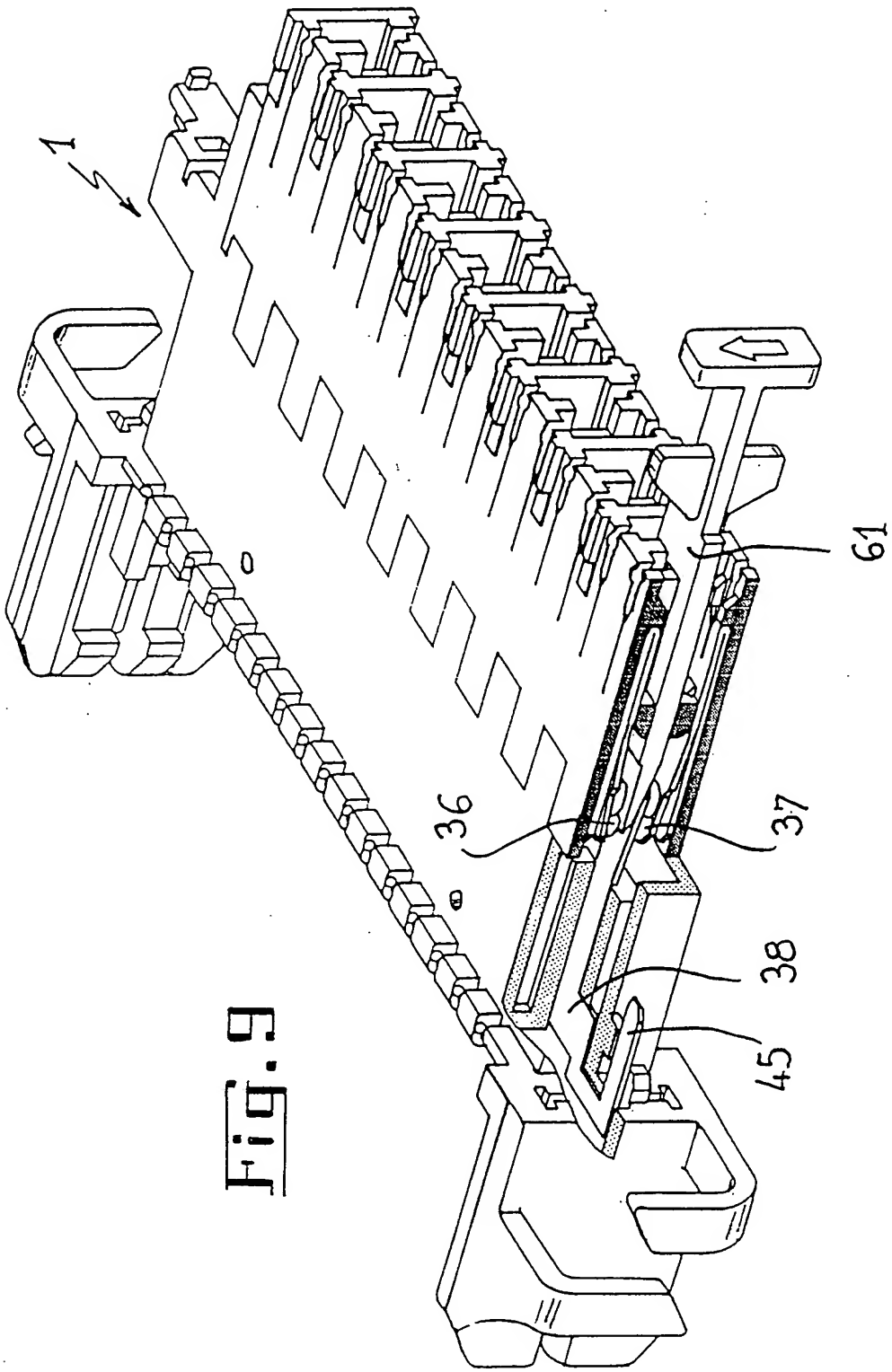


Fig. 9

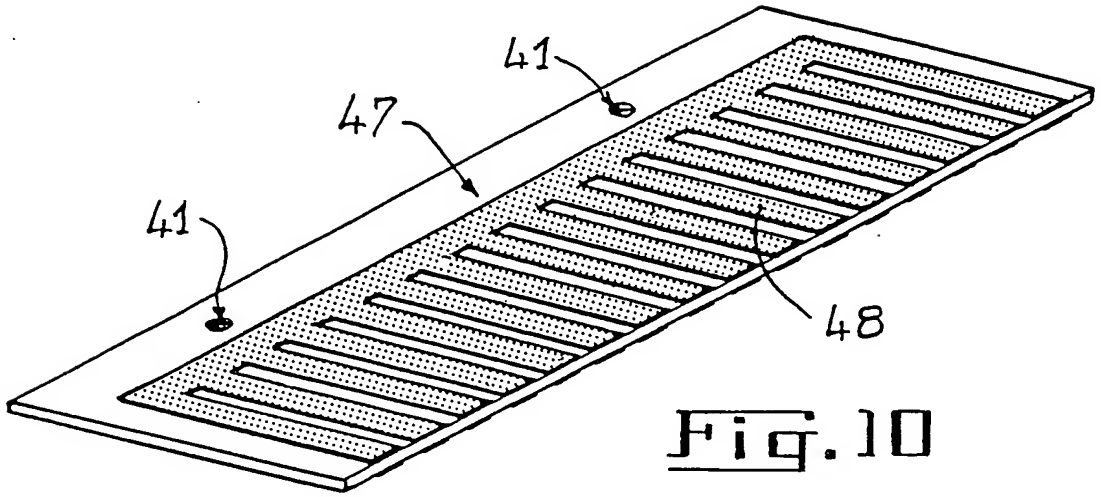


Fig. 10

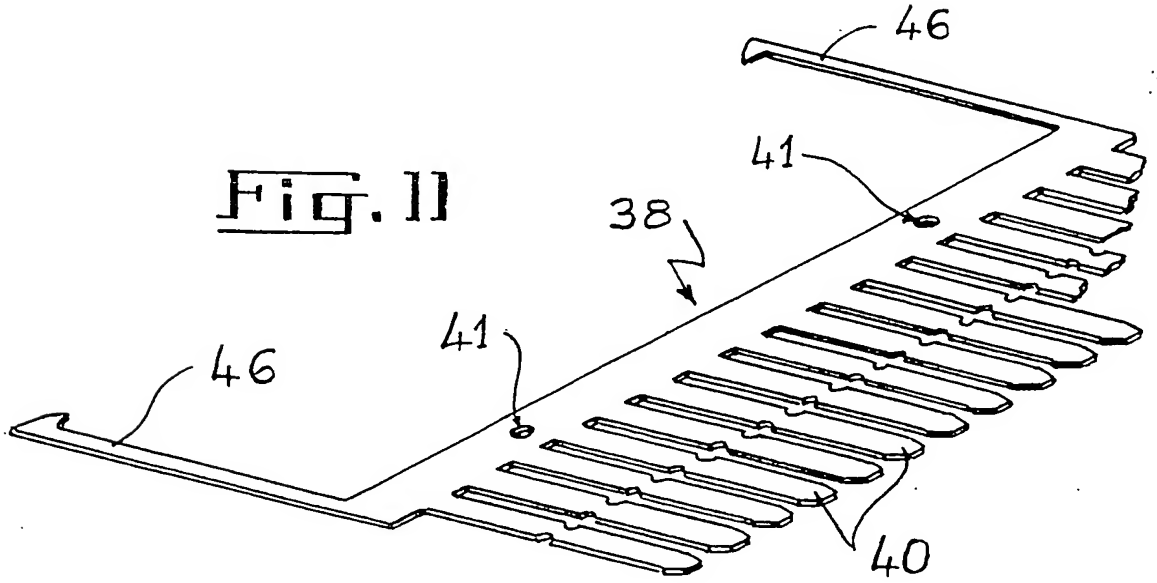


Fig. 11

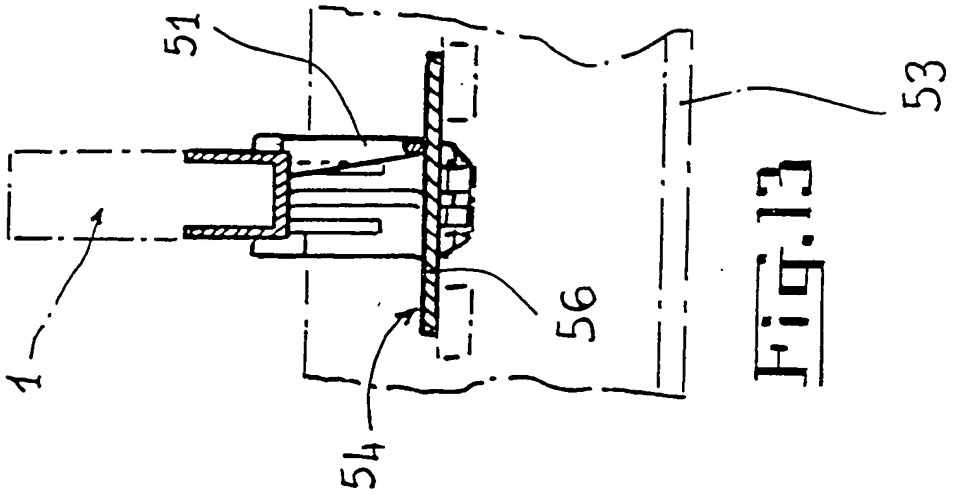


Fig.13

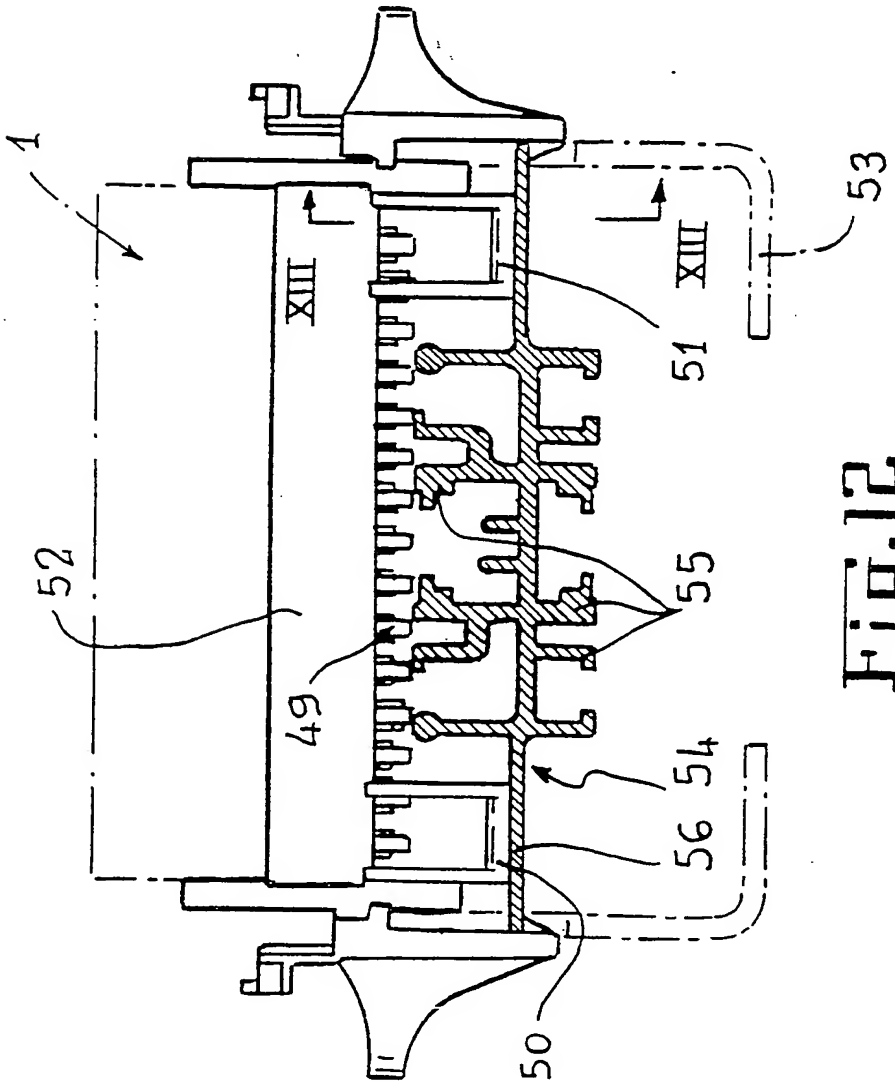


Fig.12

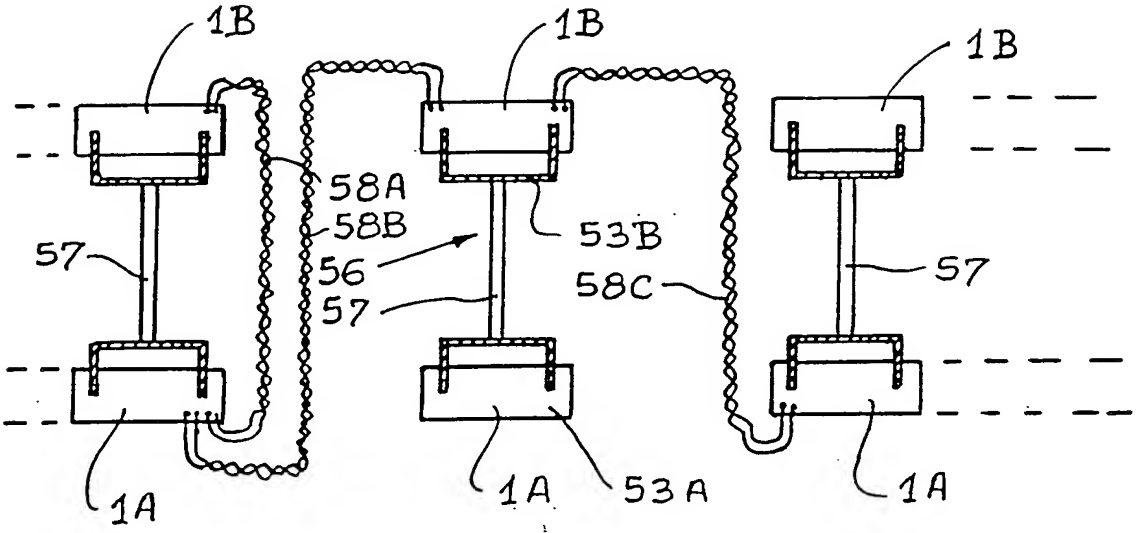

1B
1B
1B
58A
58B
57
56
57
53B
58C
57
1A
1A
53A
1A

Fig.14

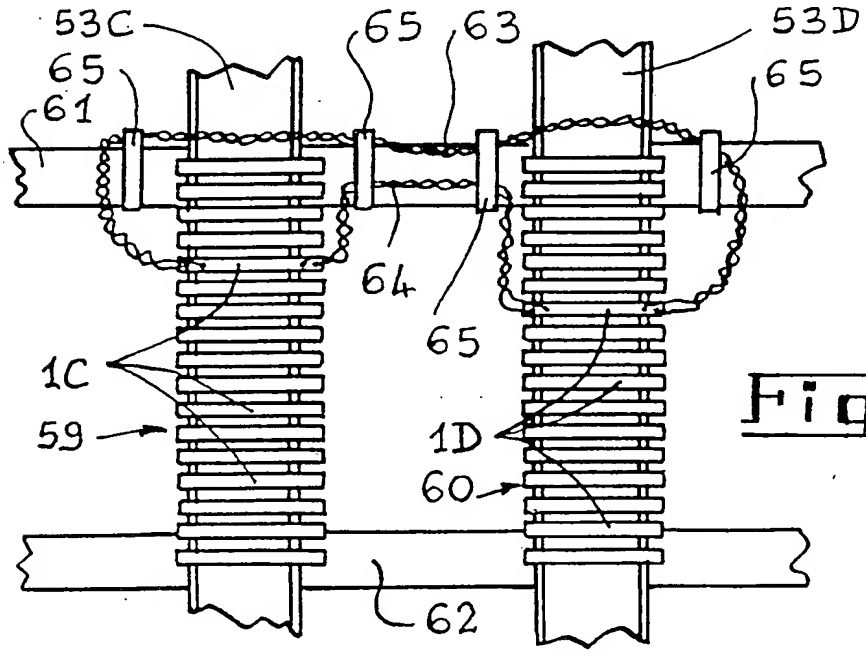

53C
65
61
65
63
53D
65
64
65
1C
59
1D
60
62

Fig.15

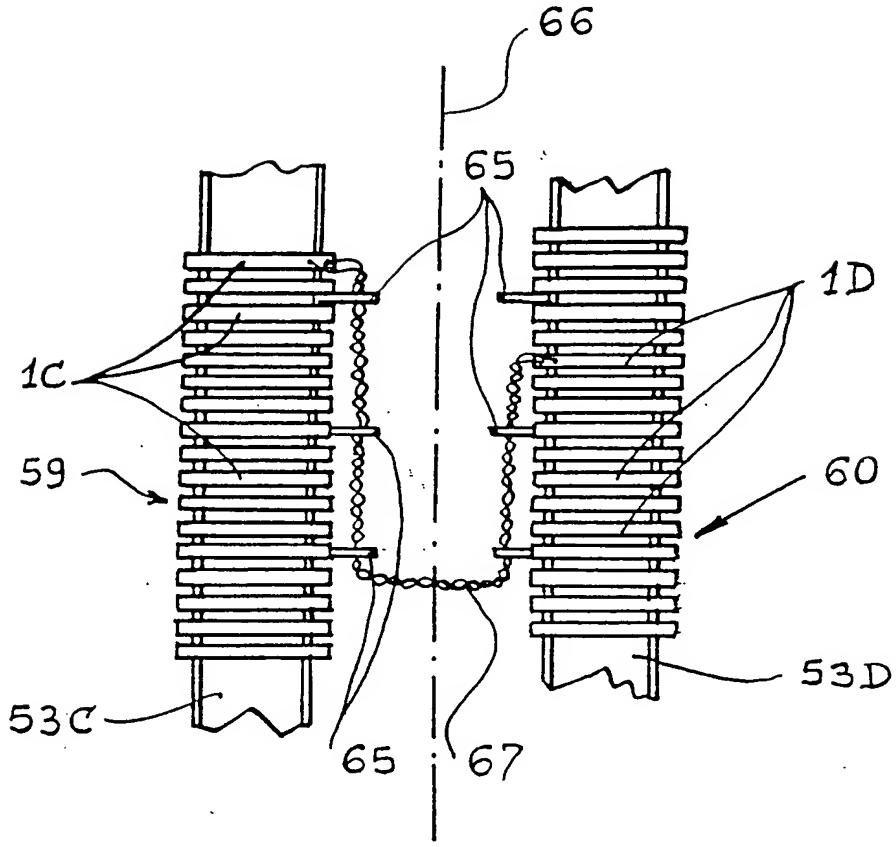


Fig.16

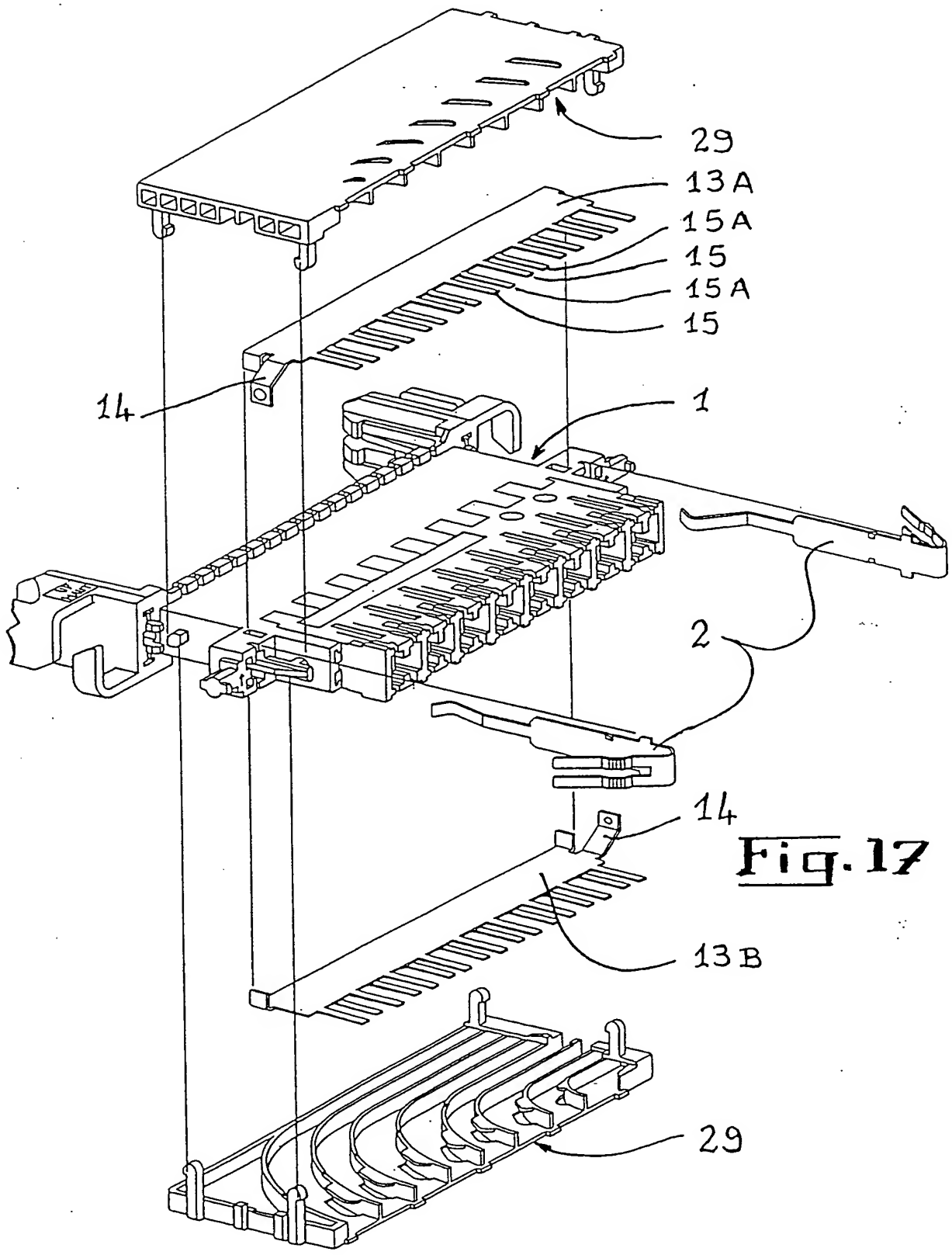


Fig. 17

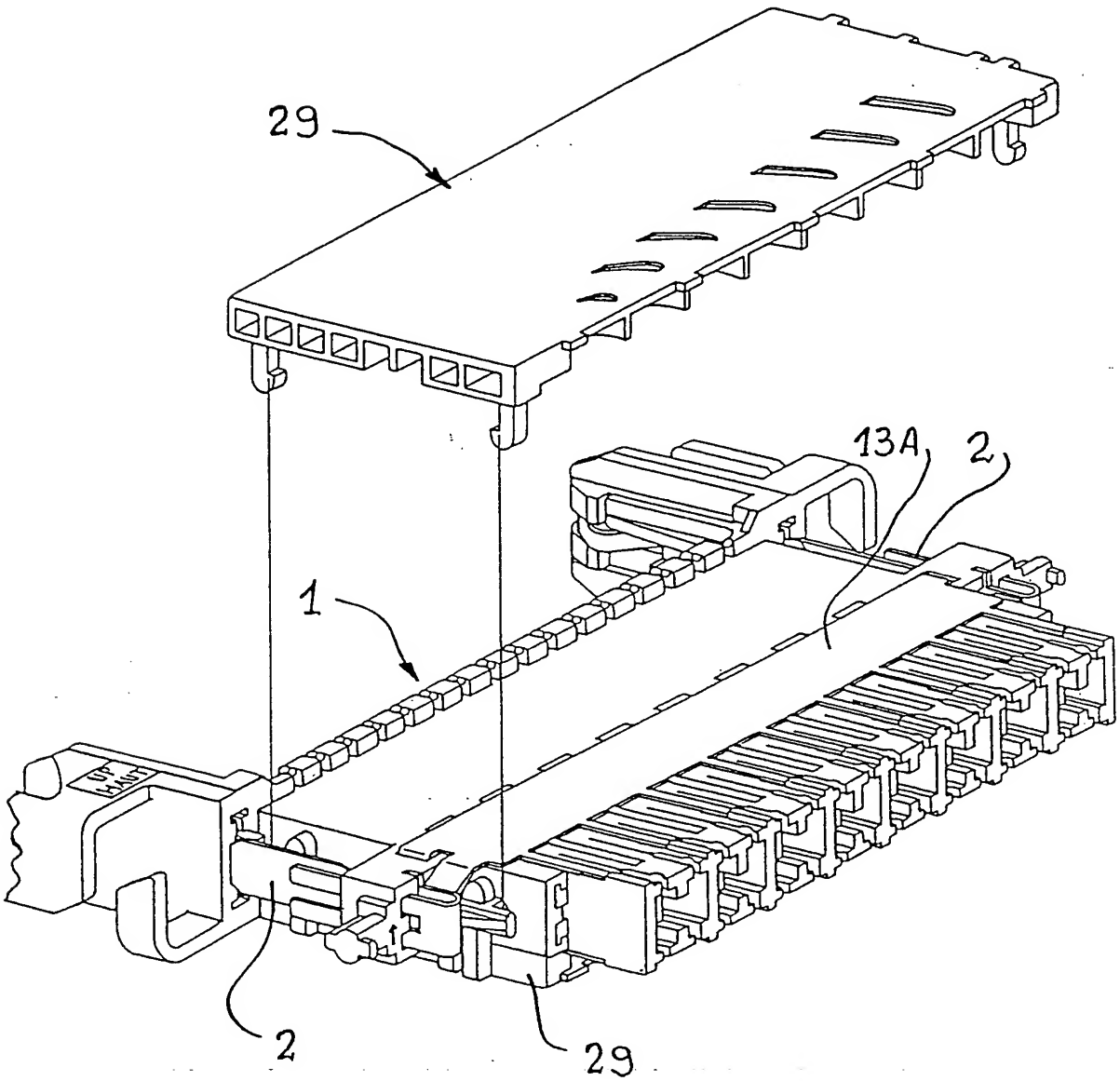


Fig. 18